

**REBUILD ATLANTA  
ENERGY AUDITOR'S REPORT  
ATLANTA DETENTION CENTER**

Prepared: August 9, 2004  
Prepared By: Cyrus Bhedwar, City of Atlanta  
Jeff Ross-Bain, Southface  
Corinne Benedek, Southface  
Assisted By: Jim Cox, Department of Corrections



## **REPORT PREFACE**

The information contained in this report consists of findings and recommendations conducted by the City of Atlanta's Energy Conservation Program through the Rebuild Atlanta initiative. The following information was gathered during a walk-through type audit designed to assess the general condition of the facility with an emphasis on discovering energy efficiency opportunities. All related observations and recommendations are based on the best available knowledge of the auditors and should not be considered conclusive, but rather an indication of building conditions. Any actions taken should be done so with the independent advice of experts. The Energy Conservation Program will be pleased to assist the Department of Corrections in coordinating this technical assistance.



## Building Summary

### **Atlanta City Detention Center 254 Peachtree St. Atlanta, Georgia 30303**

Year Built:	1995
Building Size:	600,000 square feet (fourteen stories)
Occupants:	800-1100 inmates
Operating Schedule:	Twenty four hours/day, seven days/week, year round
Electricity Cost (2003):	\$359,110
Electricity Usage (2003):	7,124,062 kWh
Cost Per Square Foot:	\$0.59/ft <sup>2</sup>
Usage Per Square Foot:	11.87 kWh/ft <sup>2</sup>
Natural Gas Cost (2002):	\$94,482
Natural Gas Usage (2002):	144,900 CCF
NG Cost Per Square Foot:	\$0.15/ft <sup>2</sup>
NG Usage Per Square Foot:	0.24 CCF/ft <sup>2</sup>

## Recommended Items

This section focuses on items that will be pursued by the Energy Conservation Program in cooperation with your department. Follow-up actions are outlined in more detail in Appendix A.

- Lighting
  - Replace all exit signs with LED exit signs when existing signs fail
  - Retrofit all incandescent downlamps with compact fluorescent lamps
- Heating, Ventilation & Cooling
  - Clean outside air intakes during routine HVAC maintenance
  - Consider replacing inlet guide cones with a variable frequency drive (VFD) when cones fail
  - Research feasibility and cost/benefit of energy recovery units
  - Research feasibility and cost/benefit of solar hot water heating
  - Research feasibility and cost/benefit of interruptible natural gas rate
- Domestic Water
  - A separate audit was conducted to determine water saving opportunities. Please consult the report prepared by the Pollution Prevention Assistance Division for recommendations.



### Reported Items

This section contains items that were noted during the energy audits but do not fall under the scope of the Energy Conservation Program. Additional detail on these items is provided in Appendix B.

- HVAC
  - Protective covers are required to prevent tampering with exposed thermostats
  - HVAC systems can be tuned-up (“retro-commissioned”) in order to maintain proper function and minimize energy waste



## Narrative

As a whole, the facility is operating in satisfactory condition and the typical low- and no-cost upgrades that may be performed in many buildings to increase energy efficiency do not present themselves to a similar degree at the Detention Center. There exists the potential to increase the operational efficiency of the Detention Center mainly through upgrades in mechanical equipment, minor repairs and installation of energy recovery equipment. Additionally, much potential exists in water savings at the facility through a variety of measures.

## General Observations

The Atlanta City Detention Center began operation in 1995 and houses approximately 800 to 1000 inmates at one time plus support staff. The full capacity is approximately 1200 inmates in 1000 cells. The facility serves mostly pretrial purposes, with occasional longer-term inmates as well. Laundry for the facility is done in-house by inmates and includes uniforms, bed sheets, and towels. The arrival and release area is located on the second floor. Many of the systems in the building may be controlled in the main security control room near the building entrance. Systems are designed to be tamper-proof, such as sprinklers heads, air registers and access to most equipment is through non-inmate areas.

## HVAC System

The primary HVAC system for Atlanta City Detention Center is a combination chilled water and medium temperature hot water system contained in a four-pipe system and includes chillers (2), boilers (2), associated pumps and built-up air-handling units with VAV system control to specific spaces. The four air-handling units are located on the second and eighth floors of the building. The cooling tower is located at street level. Air volume is controlled at the air-handling units through the use of inlet cones.

Conditioned air in the building is exhausted to the outside via two large capacity centrifugal, pad mounted exhaust fans. The fan capacities are 46,000 and 40,000 cfm respectively. This exhaust is taken, generally, from each cell, the common holding areas and toilet rooms.

There is a mechanical room on each mezzanine level that contains individual PIUs or VAVs for each pod (combination of cells and common space). The PIUs are located on the visitation levels, allowing repair crews' access from public areas. Facilities staff are responsible for changing air filters in the air-handling units.

The main mechanical room is on the lower level and houses the chillers, boilers, domestic hot water equipment, pumps, fire pumps, electrical switchgear and controls. The area is spacious and is well maintained. The boiler room has several outside air intakes on street level. Some intakes connect directly to the room and others are connected to a mechanical system for make-up air. At the time of this survey, the air intakes were fouled with leaves and other debris and it was noted that these intake louvers require frequent cleaning. Additionally, to prevent fouling, the bird screen on one of the louvers was removed allowing leaves and other debris to enter the plant.



The facility has two gas-fired boilers for space heating which operate on a run-standby configuration. The boilers primarily burn gas but have a supplemental capacity to burn fuel oil. The boilers were originally set to turn on at outside air temperatures of 55 degrees F. Nominal water temperature is 180 deg F. Presently, the settings have been changed to start the boiler at 60 degrees outside air temperature with lower temperature water. The boilers were shut down for the season at the time of this visit.

The air distribution system of the building supplies air to the cells as well as the common spaces or pods, but only returns air from the common spaces. All air from the cells and the arrival/release area is exhausted in order to prevent the transfer of communicable diseases. Approximately 15 cfm of conditioned outside air is supplied per inmate to the cells.

The HVAC system is pneumatic and is controlled via a Siemens controller. Some individual thermostats exist in the common spaces but none exist in the individual cells. In some instances, thermostats are located in the return ducts. Where thermostats are located in the open space, the Detention Center requires greater funding to purchase adequate boxes to cover and protect the thermostats.

#### Lighting System

The lighting of the current facility consists mostly of 34 Watt- 2 bulb fixtures. The lighting controls of the building seem to be operating in a satisfactory condition. The EXIT signs contain compact fluorescents, a great savings to the facility. There is a potential savings to be made by an in-depth analysis of the lighting systems and controls, however, at this time, it is recommended that this work be postponed in order to implement other energy efficiency measures as noted below.

#### Domestic Water System

There exists great potential for water savings at the Atlanta City Detention Center. The main water uses of the building are the laundry, the kitchen, and showers. Shower use is primarily concentrated around 8:30am with laundry operations running concurrently. Four gas fired boilers heat water for showers and two gas-fired boilers provide the laundry and the kitchen with hot water.

The facility currently experiences problems with the hot water mixing valves for the showers. On several occasions, users have learned to turn on multiple showers in order to get adequate hot water.

The water bill of the facility exceeds the energy bill cost. The facility is still working to determine the most optimal shower system with assistance from the Pollution Prevention Assistance Division. Additionally, the facility managers expressed that filtration of incoming city water may assist in operations as prior inspections of valves have revealed fouling.



## Goals

The Atlanta Detention Center is a well-maintained and operated facility and as mentioned, presents few opportunities for no and low cost energy efficiency improvements. However due to the size and full time operation of this facility there are at least two major capital projects that deserve further exploration. These include the installation of energy recovery units and the installation of a solar hot water heating system. Pending the availability of Department of Corrections staff, the Energy Conservation Program expects to complete all research and planning by June 2005 and will be prepared to make recommendations about whether to pursue these options with professional technical assistance.

## Conclusion

The Atlanta Detention Center offers the potential to become a marquee facility in terms of energy efficiency and excellence in operations through selected capital upgrades and continued attention to facility maintenance and improvement.



## **Appendix A: Recommended Actions (Follow-up Action Planned)**

### Lighting

Purchase replacement lighting fixtures (lamps, ballasts, luminaires, exit signs, etc.) in accordance with the *City of Atlanta Lighting Retrofit Guidelines*.

### Heating, Ventilation & Cooling

Include cleaning of outside air intakes in HVAC maintenance contract

Consider replacing inlet guide cones with a variable frequency drive (VFD) when cones fail; refer to *Equipment Replacement Guidelines: Variable Frequency Drives* for additional information.

Coordinate with Energy Conservation Program to research feasibility and cost/benefit of energy recovery units

Coordinate with Energy Conservation Program to research feasibility and cost/benefit of solar hot water heating

The Atlanta Detention Center may generate savings by switching to an interruptible natural gas rate. This rate may require the Detention Center to curtail natural gas usage during periods of peak usage (i.e. very cold winter days) in exchange for a lower rate. Further study is required to determine the impact on Detention Center operations.

### Domestic Water

Coordinate follow-up meeting to discuss recommendations made in water audit report prepared by the Pollution Prevention Assistance Division





## **Appendix B: Reported Items (No Follow-up Action Planned)**

### HVAC

A building tune-up is recommended to restore a building's mechanical and lighting systems to their design intent while adapting to any changes that have taken place in order to maximize operating efficiency. In a building the size of the Detention Center, a tune-up should be performed at least once a decade to maintain optimum performance. A scope of services for a building tune-up ("retro-commissioning") can be developed by the Energy Conservation Program in cooperation with the Department of Corrections.



## Appendix C: Additional Resources

### Lighting

Please see separate attachments, *City of Atlanta Lighting Retrofit Guidelines*, for information on how to conduct a building lighting upgrade and for product specifications.

### HVAC

Please see the separate attachment, *Proposed Project Brief: Energy Recovery Units* for an overview of the potential capital project.

Please see the separate attachment, *Proposed Project Brief: Solar Hot Water Heating* for an overview of the potential capital project.

### Operations & Maintenance

Please see the separate attachment, *Equipment Replacement Guidelines: Variable Frequency Drive*, for equipment upgrades options when replacing equipment that has reached the end of its service life.

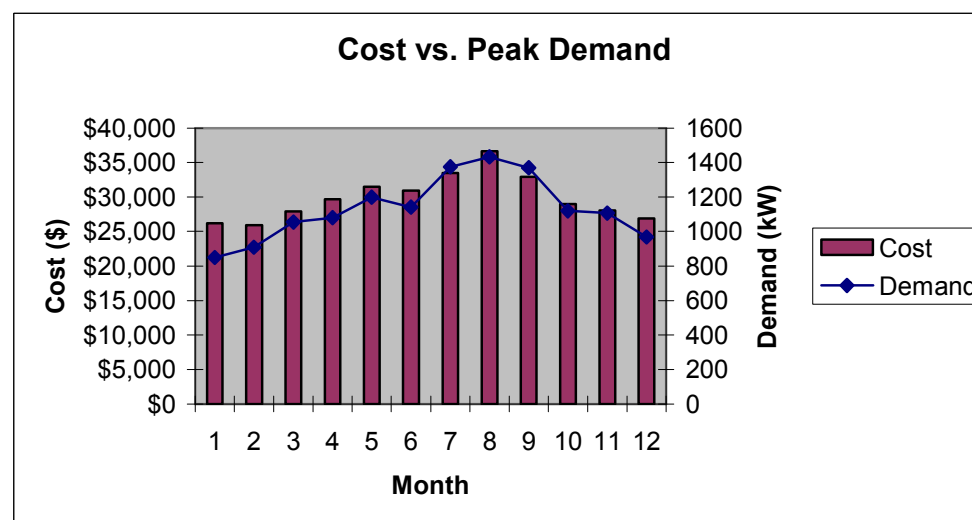
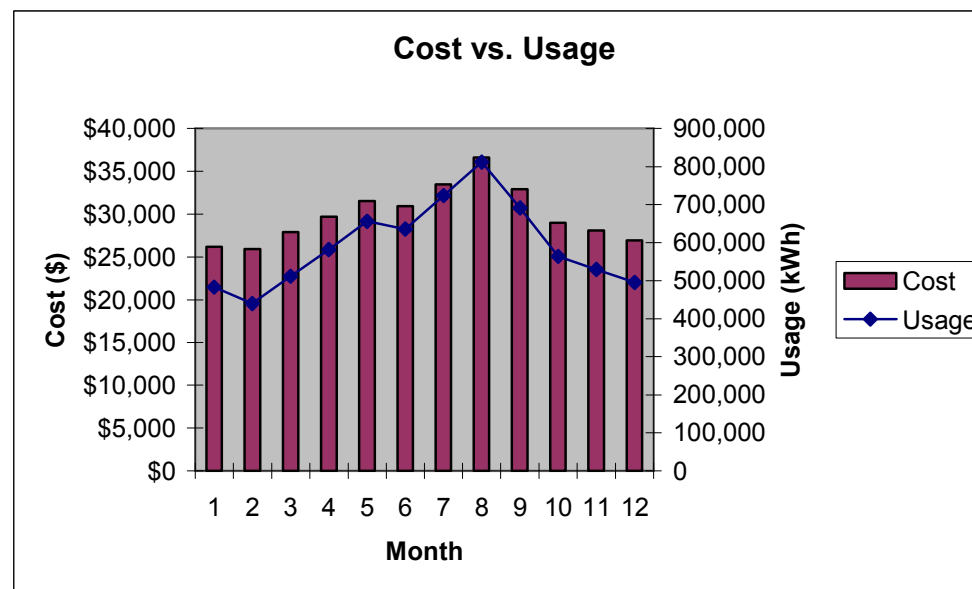


## **Appendix D: 12 Month Utility Data**

The Table on the following page shows the electricity use, cost and peak demand for the year 2003. The top graph, labeled “Cost vs. Usage” shows the relationship between electricity consumption and cost for the year 2003. The bottom graph, labeled “Cost vs. Demand” shows the relationship between cost and peak demand for the year 2003.

Additionally, since major recommendations in this facility offer the potential to reduce natural gas usage, natural gas consumption and cost are provided.

Month	kWh	Peak kW	Cost
Jan-03	483,388	850	\$26,191
Feb-03	439,615	909	\$25,919
Mar-03	511,478	1054	\$27,890
Apr-03	581,981	1079	\$29,688
May-03	655,827	1199	\$31,513
Jun-03	635,714	1141	\$30,924
Jul-03	723,698	1375	\$33,480
Aug-03	811,882	1433	\$36,625
Sep-03	691,114	1369	\$32,916
Oct-03	564,080	1119	\$28,959
Nov-03	529,724	1107	\$28,096
Dec-03	495,561	968	\$26,929
<b>Total</b>	<b>7,124,062</b>	<b>N/A</b>	<b>\$359,130</b>



## Natural Gas Data

Month	CCF	Cost
Jan-02	32,040	\$20,892
Feb-02	24,315	\$15,855
Mar-02	16,182	\$10,551
Apr-02	11,417	\$7,444
May-02	7,635	\$4,978
Jun-02	5,420	\$3,534
Jul-02	5,497	\$3,584
Aug-02	5,150	\$3,358
Sep-02	6,320	\$4,121
Oct-02	8,840	\$5,764
Nov-02	14,890	\$9,709
Dec-02	32,450	\$21,159
<b>Total</b>	<b>170,156</b>	<b>\$110,950</b>

